In Cell City all of the landmarks represent cellular organelles. The aim of the game is to reach the town hall first, collecting all of the pieces of the ‘cell pie’ along the way.

TO PREPARE THE GAME:

• Print out the board as big as you can. A3+ is best.
• Print out the ‘cell pies’ – one per player.
• Cut the ‘cell pies’ along the black lines to give six pieces.
• Print out the “!” and “?” cards and cut them out.

Extra items you will need:
• Counters
• Dice

Have fun ...
In Cell City all of the landmarks represent cellular organelles. The aim of the game is to reach the town hall first, collecting all of the pieces of the ‘cell pie’ along the way.

INSTRUCTIONS

To start, all players should roll the die. Whoever gets the highest score goes first (if there is a tie, the die is rolled again until a winner is decided).

Players take it in turns clockwise to roll the die, moving their counter along the board for that number of squares.

When a player lands on or passes a Cell City landmark:

When a player lands on/passes a landmark (the power station, factory, post office, recycling plant, incinerator or town hall), they win that piece of the cell pie. Every player collects a piece of the cell pie as they land on/pass each landmark so that they have a full cell at the end of the game.

If a player lands on a “?” square:

On their next turn, another player takes the top card from the “?” pile and asks the player that question. If the player gets the question right, they roll the die and move on. If they get the question wrong, they miss that turn. The player does not need to answer another question on their next turn, they can just roll the die and move on.

If a player lands on a “!” square:

On landing on a “!” square, the player immediately selects the top card from the “!” pile and moves forward or back along the board according to the instructions on the card.

The winner is the person to reach the town hall first.
Endoplasmic Reticulum (ER)

The ER is a network of tubes and flattened sacks which makes loads of things for the cell including proteins and some lipids. It also stores calcium.

Nucleus

The nucleus is the 'brain' of the cell, controlling all of its activities. The nucleus contains tightly wound strings of DNA called chromosomes.

DNA is simply a set of instructions that tell the cell what to do.

Golgi Apparatus

The Golgi Apparatus is made up of sheets of flattened sacks called cisternae. Its main job is to process and package proteins and lipids from the ER and send them to the correct part of the cell.

Mitochondria

The mitochondria are the power stations of the cell. They use glucose and oxygen to make ATP, which fuels the cell.

Endosomes

Endosomes take proteins from the cell membrane to the lysosomes for destruction. Along the way, they could be re-used.

Lysosomes

Lysosomes are acidic inside and contain a mix of enzymes to break down and digest proteins and lipids.
How big is an average human body cell?
A. Ten metres across
B. Ten Kilometres across
C. Ten Millimetres across
D. Ten Micrometres across

What is the main job of the Mitochondria?
A. Make Proteins
B. Provide Energy
C. Hold Water
D. Kill Bacteria

How many cells does an average human body contain?
A. 100 thousand
B. 100 trillion
C. 100
D. 100 million

What are the longest cells in the human body?
A. Neurons
B. Red Blood Cells
C. Skin Cells
D. Liver Cells

What is the main job of the Endosomes?
A. Provide Energy
B. Make DNA
C. Recycle Proteins
D. Make Proteins

What does the nucleus contain?
A. Chlorophyll
B. Blood
C. Chromosomes
D. Bacteria

What is the main job of the Lysosomes?
A. Provide Energy
B. Destroy unwanted Proteins and Bacteria
C. Hold Water
D. Make DNA

What is the main job of the Golgi?
A. Sort Proteins for Delivery
B. Provide Energy
C. Kill Bacteria
D. Make DNA
<table>
<thead>
<tr>
<th>Question</th>
<th>Options</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Where do the endosomes take unwanted proteins?</td>
<td>A. Nucleus</td>
<td>D</td>
</tr>
<tr>
<td></td>
<td>B. Mitochondria</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C. Cell Membrane</td>
<td></td>
</tr>
<tr>
<td></td>
<td>D. Lysosomes</td>
<td></td>
</tr>
<tr>
<td>Which cells have no nucleus?</td>
<td>A. Liver cells</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>B. Red Blood Cells</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C. Neurons</td>
<td></td>
</tr>
<tr>
<td></td>
<td>D. Skin Cells</td>
<td></td>
</tr>
<tr>
<td>What are chromosomes made of?</td>
<td>A. Lipids</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B. DNA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C. Endosomes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>D. Water</td>
<td></td>
</tr>
<tr>
<td>Which organelle is the most acidic?</td>
<td>A. Lysosome</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>B. Nucleus</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C. Endoplasmic Reticulum</td>
<td></td>
</tr>
<tr>
<td></td>
<td>D. Endosome</td>
<td></td>
</tr>
<tr>
<td>Which organelle coordinates the activities of the cell?</td>
<td>A. Endoplasmic Reticulum</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>B. Golgi Apparatus</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C. Nucleus</td>
<td></td>
</tr>
<tr>
<td></td>
<td>D. Mitochondria</td>
<td></td>
</tr>
<tr>
<td>Which organelle can destroy invading bacteria?</td>
<td>A. Golgi</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B. Endoplasmic Reticulum</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C. Lysosome</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>D. Nucleus</td>
<td></td>
</tr>
<tr>
<td>Along with making proteins, the ER is a major storage point for which of the following?</td>
<td>A. Calcium</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>B. Iron</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C. Cobalt</td>
<td></td>
</tr>
<tr>
<td></td>
<td>D. Chlorine</td>
<td></td>
</tr>
<tr>
<td>What are chromosomes made of?</td>
<td>A. Lipids</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B. DNA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C. Endosomes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>D. Water</td>
<td></td>
</tr>
<tr>
<td>Which organelle is the most acidic?</td>
<td>A. Lysosome</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>B. Nucleus</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C. Endoplasmic Reticulum</td>
<td></td>
</tr>
<tr>
<td></td>
<td>D. Endosome</td>
<td></td>
</tr>
<tr>
<td>Which cells have no nucleus?</td>
<td>A. Liver cells</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>B. Red Blood Cells</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C. Neurons</td>
<td></td>
</tr>
<tr>
<td></td>
<td>D. Skin Cells</td>
<td></td>
</tr>
<tr>
<td>Which organelle coordinates the activities of the cell?</td>
<td>A. Endoplasmic Reticulum</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>B. Golgi Apparatus</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C. Nucleus</td>
<td></td>
</tr>
<tr>
<td></td>
<td>D. Mitochondria</td>
<td></td>
</tr>
</tbody>
</table>
OH NO!
Temperature too low. Reactions running too slowly.

Go back 1 square

GOOD NEWS!
Other cells are telling you to divide.

Move on 2 squares

OH NO!
Levels of glucose too low for the mitochondria to make energy!

Go back 2 squares

GOOD NEWS!
Protein synthesis is running smoothly in the ER.

Move on 1 square

OH NO!
Proteins in the Endoplasmic Reticulum are misfolded!

Go back 3 squares

GOOD NEWS!
Plenty of glucose for the mitochondria to make energy.

Move on 2 squares

OH NO!
Temperature too high. Proteins are starting to degrade!

Go back 2 squares

GOOD NEWS!
The endosomes are recycling proteins efficiently.

Move on 1 square
OH NO!
The Golgi is sending proteins to the wrong locations.

Go back 2 squares

GOOD NEWS!
Lysosomes have destroyed some invading bacteria.

Move on 2 squares

OH NO!
The endosomes are not recycling proteins!

Go back 2 squares

GOOD NEWS!
Plenty of oxygen is reaching the mitochondria.

Move on 2 squares

GOOD NEWS!
Lysosomes have destroyed some invading bacteria.

Move on 2 squares

GOOD NEWS!
Plenty of oxygen is reaching the mitochondria.

Move on 2 squares

GOOD NEWS!
Proteins are moving through the Golgi efficiently.

Move on 1 square

GOOD NEWS!
The Endoplasmic Reticulum is making lots of proteins.

Move on 2 squares

OH NO!
Neighbouring cells are telling your cell to stop dividing!

Go back 1 square

GOOD NEWS!

The Endoplasmic Reticulum is making lots of proteins.
OH NO!

Too much Calcium in the ER!
Go back 2 squares

GOOD NEWS!
Lots of ATP for cellular reactions.
Move on 2 squares

OH NO!

Too little Calcium in the ER!
Go back 2 squares

GOOD NEWS!
Neighbouring cells are telling your cell to divide.
Move on 2 squares

OH NO!

Viral infection!
Go back 3 squares

GOOD NEWS!
Cell division completed.
Move on 1 square

OH NO!

Not enough oxygen!
Go back 1 square

GOOD NEWS!
No mutations in the DNA.
Move on 2 squares